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ABSTRACT

The Demonstration Center for Language Handicapped (LH) Children is described as a project, executed in two Texas public schools between 1971 and 1973, which evaluated the following three treatment approaches to LH students: regular classroom placement and provision of inservice training and appropriate materials to the regular teacher; regular class placement combined with placement in a resource room; and special class placement. First year research data is presented in the following areas: independent variables such as instructional programs, appraisal protocols, grade level, teacher aides, and inservice training; sampling procedures; control groups; data collection; criterion testing; and results. Data showed generally that if a LH child identified as such is placed in the regular class he will achieve less than if he remains unidentified, but that if the child is given the full support of specialized personnel, he will gain more than if he remains unidentified. Second year data is provided for the following topics: the definition of LH, research questions, performance objectives, types of intervention programs, research contrasts between 1 year and 2 years of intervention, attitudes of LH children toward themselves and school, criterion testing, and results. (GW)

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RESEARCH DESIGN AND RESULTS

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Demonstration Center for Language-Handicapped Children

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REGION IV

EDUCATION SERVICE CENTER

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DEMONSTRATION CENTER

FOR

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Introduction

The Demonstration Center for Language-Handicapped Children (The Language Center) was a project of the Texas Education Agency and Region IV Education Service Center. The purpose of the project was to examine various methodologies that could improve the academic achievement of children who had been identified as having a language handicap. Children with language handicaps were defined as those who showed a significant discrepancy between their potential for performing and their actual performance in one or more basic language areas--auditory, spoken, reading, or written language. This definition excluded children who scored in the mentally retarded range on standardized intelligence tests or whose language skill deficits were attributed to bilingualism, emotional disturbance, sensory deficit or emotional impairment.

Two school districts in the greater Houston area participated in the study. One, the Aldine Independent School District, is of moderate size with a school enrollment of approximately 28,000 students. It may be considered to be surburban in nature although only recently so. The other, Spring Independent School District, is small, with a total enrollment of approximately 4,000 students. Due to the rapid growth of the Houston metropolitan area it is changing but is still primarily rural.

The Language Center was in operation from February, 1971 to August, 1973; intervention with language-handicapped children took place during the 1971-72 and 1972-73 school years. The school year 1971-72 constituted the basis for the first year program; the school

year 1972-73, basis for the second year program.

One of the primary tasks of The Language Center was to examine, in a public school setting, various elements considered potentially helpful in improving school achievement among children with language handicaps. Program intervention was a major element in the basic design. The research design incorporated the three major treatment approaches being investigated in the United States today: (1) placing the child in the regular classroom and giving the regular classroom teacher inservice training and instructional materials appropriate to the child, (2) placing the child both in a resource room environment and the regular classroom, and (3) placing the child in a self-contained classroom for extensive work. Additional information was gathered on the usefulness of support personnel, on types of appraisal, and on different grade levels.

This report analyzes data gathered for the first and second years of the program. Robert McClintock (University of Houston) contributed to the development of the initial experimental design and data collection procedures. The first section of this report will deal with an evaluation of the first year's research. The second section deals with an evaluation of the second year's research. The third section deals with an analysis of subsidiary questions related to the language-handicapped child; namely, attitudes toward self and school, effects of transition back into the regular classroom, and effects of a second year of intervention.

First Year Research Design and Results

In one sense, four distinct experiments were conducted in the first year. Each attempted to establish the effect or the associative conditions of an experimental (independent) variable upon the achievement of children who had previously been identified as possessing a handicap in language.

"Achievement," the project's criterion (dependent) variable, was defined in three different ways to accommodate three research components.

Single measures produced a *status* analysis of some specific types of achievement, providing information as to the associative quality of experimental variables and that achievement.

Two sequential measures on the same student produced a *change* analysis of a specific kind of achievement, providing information as to the relationships between experimental variables and differential amounts of change over time in student achievement.

A series of sequential measures on the same student yielded a *trend* analysis for specific types of achievement, providing information as to the relative rates of change under the experimental variables.

For each of these three kinds of measures, the numerical analysis and statistical treatment was somewhat different; however, in all three instances the basic research design was the same. Three types of decisions, then, were possible from the studies of The Language Center: status associations with the independent variables, changes related to the independent variables, and trends or rates of change related to the independent variables. The primary statistical technique used to test hypotheses was the analysis of variance, and the research design was formulated to facilitate this procedure.

In all instances, the element measured as a dependent variable

was a product by a child previously diagnosed as possessing a language handicap. Subsequent investigations sought to determine the effects of four different kinds of independent variables upon that product.

While it would be possible to carry out four distinct experiments in order to obtain the desired information, there were several advantages to investigating all four experimental variables simultaneously. The first advantage was that it was possible to detect not only the effect of a single variable upon the product but also the interactive effect of two or more variables that might produce a composite effect. A second advantage was the presence of a high degree of control within the design. The approach was powerful since any given category acted as a control for the others. The third advantage was one of economy; a minimum number of subjects provided a maximum amount of information. This was particularly important as subjects were relatively expensive to test and teach under experimental conditions.

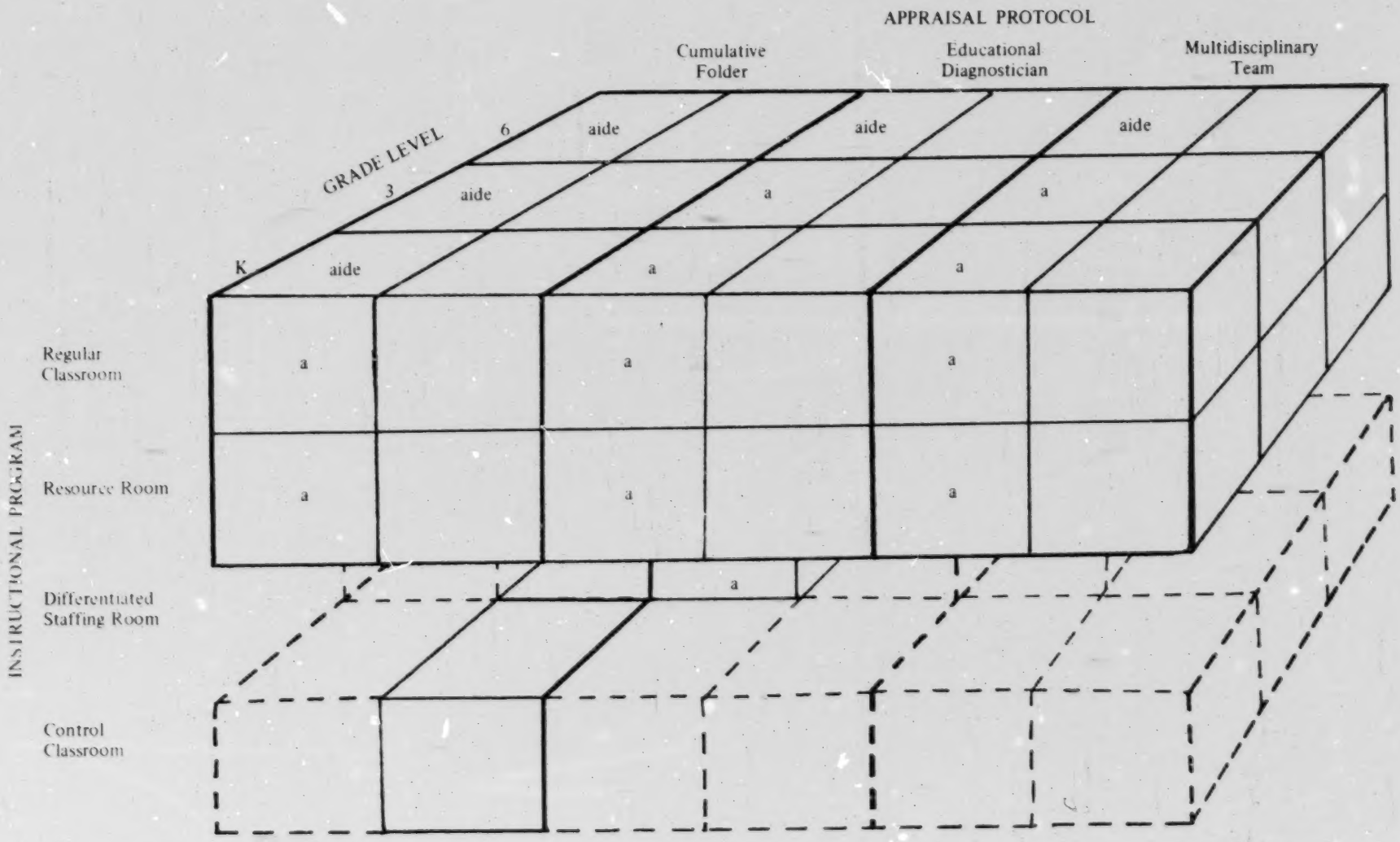
In brief, the basic approach of the research study associated four independent variables with a series of dependent variables; each dependent variable was a product or measure of achievement for the selected children. A graphic view of the design is shown in Figure 1.

The Independent Variables

Independent variables included instructional program, appraisal protocol, grade level, and teacher aides.

Instructional programs. The first independent variable was that of instructional programs selected as potentially beneficial to language-handicapped students. Two categories of this variable were

FIGURE 1
RESEARCH DESIGN



fully crossed with all other independent variables while two other categories were only partially crossed.

Placement of language-handicapped children in the regular classroom situation was termed Instructional Program A. This was contrasted throughout all comparisons with the placement of language-handicapped children in classrooms which scheduled them into a resource room for only a portion of the day, Instructional Program B. Since all other comparisons were contained equally under each of these two teaching approaches, a stong test of the relative merits of the regular classroom and the use of a resource room was obtained.

Instructional Program C was a self-contained classroom containing only language-handicapped students and a team of special instructional personnel. This teaching approach was so different from the other components of the design that it was dealt with in an entirely distinct analysis. It was possible to determine the relative merits of this highly unusual classroom setting in contrast to common elements under Instructional Program A and Instructional Program B.

In another analysis, Instructional Program D was designated as a regular classroom situation indistinguishable from any ordinary classroom. Instructional Program D was used for control purposes to establish a base of comparison for the other three programs.

Appraisal protocols. The second independent variable was that of the appraisal protocols utilized in diagnostic work with the student. Students in Instructional Programs A and B were equally divided into three groups, each of which was assessed using a different approach to pupil appraisal.

Protocol I consisted of the appraisal services of a team of professional diagnosticians from a variety of disciplines. Their assessments were reviewed by project specialists to make an educational plan with follow-up services available for each student. This protocol was the most extensive and required maximum participation by noneducational specialists.

Protocol II provided intensive assistance for the teacher through the services of an educational diagnostician. In this procedure, the educational specialist was available to the teacher for planning and follow-up of specific educational experiences for individual students.

Protocol III provided only limited assistance to the classroom teacher. The ordinary kinds of information that would be available in all students' folders were the limits of assistance provided; the teacher was expected to provide all prescriptions for teaching and follow-up of educational experiences for the students.

These three conditions of appraisal protocol enabled the project to make a stong comparison of the relative values of extensive external assistance in pupil appraisal, intensive internal assistance, and routine information.

Grade level. For each of the six combinations of Instructional Programs A and B with the three protocol types, instruction took place at three levels--Kindergarten, Grade 3, and Grade 6. The use of three grade levels provided information as to the changing nature of achievement at various scholastic level (ages) under the six conditions discussed above. The possibility that different instructional approaches

might be necessary to maximize benefits to children at different levels (ages) was fully accommodated in this research design.

Teacher aides. Two experimental conditions of teacher aides were used to determine the potential effectiveness of paraprofessionals in the teaching situation. Half the classrooms in each of the eighteen combinations of Instructional Programs A and B (with the three types of protocols at three grade levels) had teacher aides assigned while the other half did not. The full range of all four independent variables was evaluated singly and in combination to gauge their effect upon the dependent variables.

Instructional Program C existed in a single condition only, that of Protocol II for Grade 3 with teacher aides present. There were three conditions of Instructional Program D: all had Protocol III assessment and were without teacher aides, but all three grade levels were present.

Inservice training. A discussion of independent variables is not complete without mention of the inservice training program carried on as an integral part of the project. While inservice training was not, *per se*, an independent variable, it was a set of different conditions wholly subsumed under the category of classroom classification. It would not be experimentally practical to provide training to assist a teacher in using Protocol I results if she were assigned students who would have the information from Protocol III. Similarly, a teacher in the regular classroom setting would not be properly benefited by inservice work related to the resource room approach. Since overlapping kinds of inservice training to teachers participating in the

study would be a source of variable contamination, it was deemed advisable to include the different aspects and contents of the inservice training as parts of the other independent variables and their interactive categories.

Sampling Procedures

A potential difficulty in all educational experiments is unequal quality of instruction among teachers. Although it is highly desirable to have "identical" teachers in a study, the ideal case is never realized. One alternative is to have the same teacher teach using the different methods being tested. This is not an improvement in experimental technique over the "identical" teacher design, however, because a teacher may be unequally effective in the several methods. In addition, there is the likelihood that one method would be contaminated by another as the teacher transfers from one method to another. Only two practical techniques exist to remove experimental biases due to differences in teacher effectiveness. These are the analysis of covariance and randomization of assignment.

In order to use the covariance technique to "equate" groups of teachers it is necessary to measure them on their effectiveness and, in essence, remove the amount of difference in effectiveness from each student's scores. This procedure does not seem desirable in the present project both because of the effort involved and because of the lack of available test instruments through which teaching skill in language areas could be quantified reliably.

Randomization assigns teachers to the various categories by chance methods. When a relatively large number of teachers is in-

volved, it is probable that effectiveness will be "balanced out" in the combinations of the various independent variables. In order to minimize the risk of having a particular combination of independent variables show a spuriously high (or low) effect because of the chance placement of a very effective (or very ineffective) teacher in that position, more than one classroom and more than one teacher was assigned to each cell or category of the research conditions. This procedure provides for more accurate interpretation of "significant" findings in the statistical analyses of the experimental conclusions.

Student selection. Preliminary screening of potential participants in the program defined a population of language-handicapped children. From the students thus identified at each grade level in each school, a certain number were randomly selected and assigned to classrooms participating in the study, with four students typically being placed in each experimental classroom. Students not randomly selected for the experiment, although meeting the definitions of the population, were not identified to school personnel but instead assigned to classes in the usual manner for that school.

School and teacher selection. Schools were randomly assigned to conditions of Instructional Program A and B for each of the aide conditions at the three grade levels. Restrictions were placed on random selection so that Instructional Programs A and B were not present in the same school at the same grade level to avoid experimental contamination. Similarly, the classrooms with aides and those without aides were not permitted in the same school at the same grade level for reasons of potential problems of teacher morale and resultant

experimental bias.

Within a given school, the principal designated the teachers who were to participate in the study; all teachers agreed to participate. It was felt that the principals' selection of teachers introduced no experimental bias since conditions of experimentation had been randomly assigned to that school at that grade level before the principal entered the picture. Insofar as the principals were concerned at the time of designating teachers, all classrooms chosen were to be "experimental" in nature. Principals were asked to designate teachers in order to enhance cooperation in the schools.

"Absolute" randomization was not possible within the practical limitations of working within a functioning school system; however, it appeared that students and teachers were selected in such a manner that bias was minimized. The sampling procedures used were expected to produce data of a quality usable in statistical analyses with good generalizability.

Control Groups

As mentioned above, the research design had a number of types and levels of control, making it possible to evaluate the various experimental conditions and their interactions for a series of criterion measures. Figure 1 gives a diagramatic view of the research design. Reference to this figure will be of assistance during the discussion of control groups.

Interior Control: Basic Experiment. The basic experiment consisted of two instructional programs (A and B), for three protocol types (I, II, and III), at three levels (K, 3, and 6), under two

conditions of teacher aides (with and without). All "aide" cells were contrasted with the "without aide" cells as their interior control; all "K" cells were contrasted with the "3" and "6" cells as mutual interior controls; "III" cells acted as interior controls for "II" cells and "I" cells relative to the type of appraisal protocol; finally, the "regular" classroom cells of Instructional Program A were contrasted as interior controls to the "resource room" cells of Instructional Program B. All elements crossed in the basic design were fully controlled by additional elements within the basic design. The process of using one level of a variable against another level of the same variable constitutes a full control in a statistical sense.

Exterior Control: Basic Experiment. The major external control for the experiment was found in the conditions of Instructional Program D, previously defined as a "regular" classroom, "without" an aide, receiving Protocol III at all three grade levels. This group of students provided a base against which the basic experiment's cells could be scaled as to effectiveness.

Instructional Program C may be described as a "self-contained" classroom, "with aides", at level "3" under Protocol II. The proper controls for this specialized programs were the two groups of students "with" aides, under Protocol II, at the Grade 3 level in both Instructional Programs A and B.

An additional source of external control was available with the students who were identified as being language-handicapped, but who were not randomly assigned to classrooms as a part of the project and who were not identified to teachers or other school personnel. Their

relative achievement in whatever classroom situation they may have been assigned to acted as an additional base control for the entire study.

Data Collection

Data were gathered in such form that they could be readily subjected to analysis by electronic computer. Coded identification numbers for each student were devised such that his placement within the research design was indicated by the code. There was also provision to match, by machine, data from district records to data from project tests to reduce duplication of effort.

General Considerations

Every effort was made to see that the variables under investigation in The Language Center were incorporated into a research design that permitted strong tests of each of them and their combinations. Randomness in assignment and selection of students from the population was carried out within the confines of a functioning school system and with certain restrictions to avoid between-treatment contamination.

The elements of inservice training were considered as a part of each instructional program; this was not handled as a separate variable but was subsumed within instructional programs.

Criterion Testing

As a partial measure of the effects of the project's instructional programs, a battery of standardized tests was administered to the pupils in the various instructional programs, to the internal control groups, and to the external control groups. These included the *Stanford Achievement Test*, *Stanford Early School Achievement Test* for kindergarten pupils (SAT), the *Gates-MacGinitie Reading Test*, and

the *Gates-MacGinitie Reading-Readiness Test* for kindergarten pupils. Measures of intellectual functioning were maintained on project pupils throughout the program but no hypothesis regarding change in intellectual performance was formulated. A posttest measure of academic performance and language skill development was obtained at the end of the first academic year.

SAT and Gates scores were obtained from all third and sixth grade pupils in both school districts, from all kindergarten pupils in Spring ISD, and from over 700 kindergarten pupils in Aldine ISD--a total of 5,800 pupils. The two criterion measures were administered to third and sixth grade pupils by project staff in Spring ISD and by classroom teachers in Aldine ISD. This was possible since an entire class of third and sixth graders could be tested at each administration.

For kindergarten pupils, a different procedure had to be employed. It has been determined by test publishers that valid test results cannot be achieved unless the following conditions are satisfied:

- That not more than twenty-four children are tested during any single test administration--preferably not more than eighteen.
- That one test session last only twenty minutes and should stop sooner if the children begin to show signs of fatigue and distractibility.
- That one test monitor be assigned to each six childred to assist them in following instructions and to notify the test administrator when to continue to the next item.
- That no more than two test sessions should be administered in a day and these should be separated by a ten minute exercise break.
- That no form of large-scale group testing begin until the third month of school.

By dividing each kindergarten class in half and testing each half in a second classroom, administration of the two criterion tests to kindergarten pupils was completed in six to eight days. Total test administration time varied from class to class depending upon the level of preschool development.

Scoring of criterion tests. All tests were hand scored with the exception of the SAT at the sixth grade level. Region IV Education Service Center provided a comprehensive test scoring service at this grade level which included scoring the SAT. Parents were employed for hand scoring the other tests, which was more economical than the machine-scoring services offered by the test publishers.

Converting raw scores to standard scores. In order to compare the results of different measures, it was necessary to convert raw scores to standard scores. These in turn were recorded on mark-read cards, placed on magnetic tape, and stored for later use with the computer.

Gates-MacGinitie Reading Test. Standard score conversion tables were included in the test administration manual of the Gates, but kindergarten subscales differed from those for the third and sixth grades. Since one aim of the project was to make comparisons across grade levels, it was necessary that the same measures, or subscales, be used for all three grades. This was done through a subjective content analysis of the items in each subscale for the different grades by a group of judges experienced and knowledgeable in the use of the Gates. The eight Gates-MacGinitie Readiness subscales were weighted and equated with the four subscales obtained from the Gates-MacGinitie

Reading Test.

Stanford Achievement Test. The SAT manual converts raw scores into percentiles and stanines, but not into standard scores. Percentiles cannot be compared and stanines are too broad a statistic to be useful in a research design. Sufficient information was available in the test manuals, however, to extrapolate standard scores from stanines and equate these with specific percentile scores. Thus, once an SAT subscale raw score was computed and translated into a percentile ranking, it was easily converted into a standard score.

The criterion measures utilized in the research were primarily taken from the *Stanford Achievement Test*. Change scores, the difference between the pretest and the posttest, were standardized and subjected to analysis. The criterion measures used were reading comprehension, math, spelling, and vocabulary.

Thus the basic design for the first year consisted of instructional programs, grade levels, aide-no aide condition, and appraisal protocol condition; it consisted of two instructional programs for three protocol types at three grade levels under two teacher aide conditions (with and without).

Results

Results of the experiment are presented in terms of the three experimental conditions: (1) general results in terms of program intervention, teacher aide, grade level, and appraisal protocol, (2) a detailed description of results, and (3) an additional analysis conducted in terms of the limited design using a control program for comparison.

Program intervention. Language-handicapped kindergarten students placed in the resource room for part of the day were found to achieve significantly greater than their counterparts placed in the regular classroom. Examination of this contrast for each of the criterion measures revealed consistency. Kindergarten students placed in a resource room for part of the day showed a greater increase in achievement than students in the regular classroom.

At the third grade level, average change scores were generally found not to differ for students in the regular classroom versus students in the resource room; however, students in both programs exhibited an increase in achievement. An additional program, a self-contained classroom, was included at the third grade. The students in this program exhibited a greater increase in spelling than did students in the regular classroom or resource room.

At the sixth grade level, average change scores for the regular classroom and the resource room were found not to differ in terms of reading comprehension. However, the combination of regular classroom and an aide appeared to be effective for spelling achievement at the sixth grade.

Teacher aide. The teacher aide condition was examined at each grade level for the various criterion measures. Kindergarten students with an aide received significantly greater change scores than students without an aide on the comprehension, spelling and math subtests. Further, students with an aide in the resource room had significantly greater change scores than students without an aide in the regular classroom. Third and sixth grade students with an aide had greater

change scores than those without an aide on the spelling subtest.

Grade level. Analysis of data across grades found that kindergarten students exhibited greater positive change in achievement than did third-grade students, who exhibited greater achievement than sixth-grade students.

Appraisal protocol. An analysis of the data across appraisal protocol indicated no differences in achievement due to type of appraisal. This was the case at each grade level and in each instructional program.

Effects of support personnel on student performance. In view of the overall results, it was useful to examine in greater statistical detail various aspects of the basic design. This was accomplished in two parts: first, in terms of support personnel; second, in terms of a subsidiary analysis involving a control group which had no aide and limited appraisal.

In addition to examining appraisal, grade level, and instructional aspects of programs for language-handicapped children, the effect of support personnel was also evaluated. This research was designed to permit decisions to be made concerning various support parameters, one of which was paraprofessional support and its effect on student academic progress. One type of paraprofessional support provided the teacher with a teacher aide trained in working with language-handicapped children, for use at whatever level and degree of contact the teacher preferred.

Concomitant to the use of paraprofessionals, the project contrasted the effectiveness of a resource room designed to serve language-

handicapped children with a regular classroom without such support. The following section examines an aide-no aide condition and a regular classroom *with* resource room support-regular classroom *without* room support condition.

Statement of the problems and hypotheses. Questions concerning the use of teacher aides and resource centers were as follows:

> What effect does the availability of teacher aides in various school programs have on language-handicapped students' academic progress?
>
> What effect does the use of a professionally-staffed resource room designed to serve pupils with language-handicaps have on their academic progress?
>
> What effect does a combination of resource room and teacher aide have on student academic progress?

Null hypotheses related to the research questions were as follows:

1. In terms of academic achievement, there is no difference between language-handicapped children who have aide support and language-handicapped children who have no aide support.
2. In terms of academic achievement, there is no interaction between language-handicapped children who are in a regular classroom only and language-handicapped children who have access to a resource teacher.
3. In terms of academic achievement, there is no interaction between teacher aide availability and resource room availability.

Mathematics, spelling, and reading comprehension were the academic areas examined for kindergarten, third, and sixth grade students. Analysis of variance was chosen to test the hypotheses for each criterion and each grade level. The dependent variables were examined separately for kindergarten, third, and sixth grade students.

Kindergarten. Kindergarten students who had an aide and spent

part of their day with a resource teacher received significantly greater positive change scores on the reading comprehension tests than did students without an aide in the regular classroom. On the spelling subtest, students with an aide had significantly greater change scores than those without an aide. On the math subtest, those students who spent part of their day in the resource room had greater change scores than regular classroom students. The following decisions were made on the null hypotheses concerning academic achievement among kindergarten students:

> Hypothesis 1 was rejected for spelling and comprehension but not for math.
>
> Hypothesis 2 was rejected for comprehension and math but not for spelling.
>
> Hypothesis 3 was rejected for comprehension but not for math or spelling.

Third grade. Third grade students with an aide had greater change scores on the spelling subtest than students without an aide. Analysis revealed no apparent differences in terms of the aide-no aide condition or in terms of the resource room-regular classroom condition for the comprehension and math subtests.

Examination of the criteria in relation to the three hypotheses revealed the following:

> Hypothesis 1 was rejected for the spelling subtest.
>
> Hypothesis 2 was not rejected for any of the criteria.
>
> Hypothesis 3 was not rejected for any of the criteria.

Sixth grade. Sixth grade students with an aide had greater change scores on the spelling subtest than students without an aide. There were no apparent differences between the independent conditions

on the other two criteria. Further, students with an aide in the regular classroom had greater change scores than students with an aide who spent part of their day in a resource room.

Examined in relation to the hypotheses the results are as follows:

Hypothesis 1 was not rejected for any of the criteria.

Hypothesis 2 was rejected for spelling but not for comprehension or math.

Hypothesis 3 was rejected for spelling but not for comprehension or math.

Results of the analysis of variance where significant differences were found are presented in Table 1.

TABLE 1

SUMMARY OF RESULTS OF ANALYSES OF VARIANCE FOR THREE MEASURES OF ACADEMIC ACHIEVEMENT FOR KINDERGARTEN, THIRD GRADE, AND SIXTH GRADE LANGUAGE-HANDICAPPED STUDENTS

HYPOTHESIS	CRITERION	GRADE	p
1. (Aide-No Aide)	Spelling	Kindergarten	.01
		Third	.01
		Sixth	.05
2. (Resource Room-Regular Classroom)	Comprehension	Kindergarten	.01
	Mathematics	Kindergarten	.05
3. (Interaction)	Spelling	Kindergarten	.01
		Sixth	.01

Discussion. The variables under study focused on the classroom teacher, the resource teacher, and the support that personnel received to better serve those boys and girls with language disabilities.

In this research design special emphasis was placed upon the effects resulting from providing such support to the teacher. As gauged by change in academic achievement, measured here by the *Stanford Achievement Test*, kindergarten students were helped by both the teacher aide and the resource specialist, i.e., this help was translated into positive change scores which were significantly greater than the change scores for students in a regular room without an aide.

For third grade and sixth grade students change scores were typically the same regardless of program or aide condition. Thus the presence of an aide or the availability of a resource room in the upper grades had no differential effect on change scores (with the exception of the spelling subtest).

Detailed Description of Overall Change in Grade Equivalents.

Several innovative instructional interventions were designed at The Language Center to help overcome the language handicaps of children with developmental language disabilities. An important question concerned the effectiveness of these programs, namely, do language-handicapped children benefit academically from being placed in a special program? This question can be answered in part by examining dependent variables associated with the experiment. This following section is a detailed description of the results previously summarized.

Pretest, posttest, and change scores for kindergarten, third, and sixth grade students are presented as Table 2, Table 3, and Table 4, respectively. Each grade level was examined separately.

Kindergarten. Examination of pretest, posttest, and change

scores for kindergarten pupils in Programs A and B reveal extent of academic achievement. Seven measures of achievement from two test batteries are shown in Table 2. In Program A the greatest change occurred in the "letters and sounds" subtest of the *Stanford Achievement Test*; in Program B the greatest change occurred in the mathematics subtest of the SAT.

TABLE 2

MEANS, STANDARD DEVIATIONS, AND CHANGE SCORES FOR CRITERION MEASURES ON KINDERGARTEN STUDENTS

VARIABLE	PRETEST		POSTTEST		CHANGE
	MEAN	S.D.	MEAN	S.D.	
PROGRAM A					
Vocabulary	42.259	4.654	45.441	5.113	3.180
Comprehension	38.185	4.065	40.254	4.249	2.069
Accuracy	39.518	5.315	41.339	5.823	1.820
Speed	35.925	3.725	40.627	6.289	4.702
Math	43.000	7.047	46.966	9.012	3.966
Letters	43.389	7.220	50.847	8.535	7.450
Comprehension	42.241	6.249	43.932	7.676	1.691
PROGRAM B					
Vocabulary	43.225	6.435	49.939	7.697	6.710
Comprehension	40.525	6.887	45.818	7.239	5.293
Accuracy	40.475	4.717	47.696	7.247	7.221
Speed	35.100	7.319	45.848	9.504	10.748
Math	42.050	12.553	53.181	9.786	11.130
Letters	44.300	11.113	55.060	11.081	10.760
Comprehension	43.125	8.780	52.393	9.270	9.268

Third grade. The pretest and posttest mean scores and grade equivalents presented in Table 3 reveal the extent of academic achievement for third grade students.

Academic progress occurred in each of the programs. In Program A there was an increase of 0.8 years, 0.8 years, 0.6 years, and 0.6 years for Mathematics, Spelling, Vocabulary, and Comprehension, respectively. In Program C, Spelling and Comprehension changed the most with increases of 2.6 year and 0.6 years respectively.

TABLE 3

MEANS, GRADE EQUIVALENTS, AND CHANGE SCORES FOR CRITERION MEASURES OF THIRD GRADE EXPERIMENTAL SUBJECTS

VARIABLE	PRETEST		POSTTEST		MEAN CHANGE	GRADE CHANGE
	Mean	Grade Equivalent	Mean	Grade Equivalent		
PROGRAM A						
Vocabulary	40.583	2.0	46.098	2.6	5.515	0.6
Comprehension	39.250	1.8	45.361	2.4	6.111	0.6
Accuracy	42.417	2.3	49.164	2.7	6.747	0.4
Speed	59.950	4.4	56.754	4.1	-3.186	-0.3
Math	33.283	1.9	43.983	2.7	10.700	0.8
Word Meaning	32.150	1.5	42.164	2.3	10.014	0.8
Comprehension	34.516	1.9	40.934	2.4	6.418	0.5
PROGRAM B						
Vocabulary	40.718	2.0	44.462	2.4	3.744	0.4
Comprehension	40.687	1.9	43.564	2.3	2.877	0.4
Accuracy	40.718	2.2	45.872	2.4	5.154	0.3
Speed	49.218	2.7	52.718	3.0	3.500	0.3
Math	36.718	2.2	42.179	2.6	5.461	0.4
Word Meaning	33.000	1.6	42.410	2.4	9.410	0.8
Comprehension	33.562	1.9	39.309	2.3	5.747	0.4
PROGRAM C						
Vocabulary	43.343	2.3	47.477	2.7	4.134	0.4
Comprehension	42.057	2.0	47.250	2.6	5.193	0.6
Accuracy	38.400	2.1	44.659	2.5	6.295	0.4
Speed	43.914	2.1	44.454	2.1	0.540	0.0
Math	38.485	2.3	45.636	2.8	7.151	0.5
Word Meaning	38.343	2.0	64.682	4.6	26.339	2.6
Comprehension	36.942	2.1	42.681	2.5	5.739	0.4

Sixth grade. The pretest and posttest mean scores and grade equivalents shown in Table 4 reveal the extent of academic achievement for sixth grade students. The academic progress that occurred was characterized by the 1.1 year increase in vocabulary in each program.

There was also a characteristic decrease in the number of attempts students required to answer questions ("Speed" in the table above), while "Accuracy" increased.

TABLE 4

MEANS, GRADE EQUIVALENTS, AND CHANGE SCORES
FOR CRITERION MEASURES ON SIXTH GRADE STUDENTS

VARIABLE	PRETEST		POSTTEST		MEAN CHANGE	GRADE CHANGE
	Mean	Grade Equivalent	Mean	Grade Equivalent		
PROGRAM A						
Vocabulary	36.514	3.6	39.345	4.7	2.830	1.1
Comprehension	36.166	3.1	36.166	3.0	0.00	---
Accuracy	40.194	4.1	44.535	4.8	4.341	0.7
Speed	51.528	5.8	51.101	4.6	-0.421	-0.2
Math	33.111	4.1	36.881	4.5	3.770	0.4
Word Meaning	36.139	3.8	39.667	4.4	3.528	0.6
Comprehension	35.361	3.7	38.167	4.2	2.806	0.5
PROGRAM B						
Vocabulary	36.694	3.6	38.816	4.7	2.122	1.1
Comprehension	36.000	3.1	35.684	3.1	-0.316	---
Accuracy	41.611	4.3	43.947	4.5	2.336	0.2
Speed	51.472	5.8	50.311	4.6	-1.156	-1.2
Math	34.111	4.1	37.842	4.6	3.731	0.5
Word Meaning	34.472	3.7	35.184	3.8	0.712	0.1
Comprehension	35.861	3.9	37.868	4.2	2.007	0.3

Discussion

The average change in reading and comprehension for language-handicapped kindergarten children in Program B (resource room) was found to be significantly greater than the average change for kindergarten children placed in Program A (regular classroom). In other words, kindergarten students placed in a resource room for a portion of the day showed a substantial increase in reading achievement. Similar gains were in evidence for other measures of achievement.

At the third grade level the average changes for math and spelling achievement were not found to differ for students in Programs A and B. An additional program, one in which language-handicapped children were placed in a self-contained classroom containing only language-handicapped students and a team of special instructional personnel, was implemented at this grade level. Program A and C students were not found to differ. However, the average change in reading comprehension for Programs A, B, and C were found to differ significantly. The third grade students in Programs A and C exhibited a greater increase in reading comprehension than did students in Program B.

At the sixth grade level the average change for reading comprehension was found to be greater for Program A (regular classroom) than for Program B (resource room). This trend was the same for other criterion measures.

Results of Analysis Within Limited Design

Between-program contrasts in the limited experimental design, regular classrooms without an aide and with only limited appraisal, indicated that in terms of individual subtests, pupils in Program A

appeared to change least while those in Program D changed most. Analysis of variance of program contrast on SAT Comprehension Change Scores, Table 5, revealed significant differences among the three programs in the limited design. No other differences were demonstrated.

TABLE 5

ANALYSIS OF VARIANCE OF PROGRAM CONTRAST FOR STANFORD COMPREHENSION CHANGE SCORES

SOURCE	DF	SS	MS	F	*p*
Total	107	7944.66			
Between	2	2100.56	1.5028	18.865	.01
Within	105	5844.1	55.658		

Third grade students in the limited design showed no apparent differential effects. In terms of achievement in comprehension, analysis of variance of sixth grade program contrasts of the SAT Comprehension Scores, Table 6, revealed that Program A (regular teacher) had a significantly greater effect than B or D.

TABLE 6

ANALYSIS OF VARIANCE FOR PROGRAM CONTRASTS FOR STANFORD COMPREHENSION CHANGE SCORES--SIXTH GRADE

SOURCE	DF	SS	MS	F	*p*
Total	127	3236.87			
Between	2	243.67	121.83	5.087	.05
Within	125	2993.2	23.945		

Students in the control groups of all three grade levels showed an increase in school achievement. Table 7 indicates the magnitude of change for kindergarten, third, and sixth graders in Program D.

TABLE 7

ACHIEVEMENT OF STUDENTS IN LIMITED DESIGN

VARIABLE	PRETEST		POSTTEST		CHANGE	GRADE EQUIVALENT CHANGE
	Mean	Grade Equivalent	Mean	Grade Equivalent		
Kindergarten						
Vocabulary	48.300	-	57.833	-	9.533	-
Comprehension	45.300	-	52.055	-	6.755	-
Accuracy	44.550	-	51.555	-	7.005	-
Speed	38.500	-	44.389	-	5.889	-
Math	43.800	-	59.389	-	15.586	-
Letters	53.350	-	65.389	-	12.039	-
Comprehension	46.950	-	61.556	-	14.606	-
Third grade						
Vocabulary	41.562	2.2	45.200	2.5	3.639	0.3
Comprehension	40.500	1.9	45.350	2.4	4.850	0.5
Accuracy	40.812	2.2	42.500	2.3	1.688	0.1
Speed	54.437	3.5	46.700	2.4	-7.737	-1.1
Math	34.687	2.0	42.200	2.6	7.513	0.6
Word Meaning	36.375	1.9	42.000	2.3	5.625	0.4
Comprehension	38.062	2.2	38.850	2.3	.788	0.1
Sixth grade						
Vocabulary	35.792	3.6	38.375	4.7	2.583	1.1
Comprehension	34.917	3.0	37.875	3.5	2.958	0.5
Accuracy	41.458	4.1	43.417	4.5	1.959	0.4
Speed	53.708	6.8	48.708	4.6	-5.000	-2.2
Math	37.500	4.5	35.958	4.4	-1.542	0.1
Word Meaning	36.333	3.8	36.792	3.9	0.459	0.1
Comprehension	36.583	3.9	37.750	4.1	1.167	0.2

When examined under limited conditions and in contrast to a control group in which language-handicapped children were not identified to the teacher, the results presented a paradox. The language-handicapped child in the control group demonstrated greater achievement than his counterparts in the special programs. Thus under limited conditions the language-handicapped child achieved more when he remained unidentified to his classroom teacher than when he was identified. This implies that if the language-handicapped child, once identified, is placed in a regular classroom with no support personnel, he can be expected to achieve less than if he remains unidentified. If the language-handicapped child is given the full support of specialized personnel, however, he can be expected to gain in achievement more than if he remains unidentified.

Analysis of interior controls revealed that classmates of the language-handicapped child continued to achieve at "normal" rates. The language-handicapped children who served as eligible controls did not achieve as much as their identified counterparts or as much as their normal classmates.

Summary of First Year Results

1. Language-handicapped and non-language-handicapped students exhibited a decrease in the rate of achievement gain from kindergarten to sixth grade.

2. Language-handicapped and non-language-handicapped students, in classroom with aides, exhibited a greater rate of achievement gain than students in classroom without aides.

3. Language-handicapped kindergarten students achieved more

when a resource room was used, while sixth grade students achieved more in a regular classroom.

4. Third grade students in the regular classroom with an aide, or in a self-contained classroom containing only language-handicapped students and a team of special instructional personnel, achieved more than third grade students in classrooms using resource rooms.

5. The various levels of appraisal protocols were equally effective in enhancing student achievement.

6. Non-language-handicapped students in classrooms with special remediation programs showed as much achievement as students in traditional classrooms.

Second Year Research Design and Results

Various dimensions of the second year program were altered based upon both objective and subjective evaluation of the first year program. The following is a description of the second year program.

Program Overview

During the second year of the program, children identified as language handicapped and selected for inclusion in the project were grouped into three categories. Students who were in the first-year study but not included in an intervention program the second year were defined as *follow-up students*. Students who were continued in the same intervention program in which they were assigned for the first year were termed *continued students*. Students assigned to an intervention program only during the second year of the project, thus representing new kindergarten, third, and sixth grade children, were defined as *new students*.

Definition of Language-Handicapped

Children with developmental language disabilities were defined as those who demonstrated a significant discrepancy between expected and actual achievement in one or more of the primary academic skills (reading, writing, spelling, and arithmetic), but whose deficits were not directly attributable to sensory, motor, intellectual or emotional handicaps.

The program organization and research design sought answers to questions relative to two years of intervention (continued students:

1971-72 and 1972-73), transitional effects (follow-up students), and one year of intervention (new students: 1972-73). These concerns were translated into specific questions and related objectives.

Research Questions

Research problems were described in terms of academic achievements of children previously identified as language handicapped. The research questions were as follows:

. . In terms of school achievement, are there differential effects due to program interventions for new students in kindergarten, in third grade, and in sixth grade?

. . In terms of school achievement, are there differential effects due to program intervention for continued students in the fourth grade?

. . In terms of school achievement, are there differential effects due to previous program intervention and subsequent transition to the regular classroom for follow-up students in first, in fourth, and in seventh grades?

Null hypotheses appropriate to each of the above questions were developed and tested at the .05 level of significance.

Performance Objectives

The overall goal of The Language Center was to devise methodologies which would help the language-handicapped child achieve in school. This broad goal was translated into specific performance objectives for the second year program. The objectives of this project for the 1972-73 school year were as follows:

. . *Continued students* will increase significantly ($p < .05$) their performance in language skill areas as measured by the Stanford Achievement Test.

. . *New students* will increase significantly ($p < .05$) their performance in language skill areas as measured by the Stanford Achievement Test.

. . *New students* will display a positive attitude toward self and toward school, as measured by the *Self Appraisal Inventory* and *School Sentiment Index*, respectively.

In addition to the three objectives listed above the project was concerned with examining the effect on achievement as the child makes a transition from a special program back to the regular classroom.

Intervention Programs

Intervention programs were designed in accordance with previously stated goals and objectives. These programs and their characteristics are described in the following section.

Intervention Program A. This program was concerned with providing diagnostic assistance, teacher aides, appropriate materials and equipment, and inservice support to enable the regular classroom teacher to deal effectively with identified language-handicapped children in a regular classroom setting. This program included placement, based upon normal assignment procedures of the school, of continued students (fourth grade) and new students (third grade) in a regular classroom. Students were randomly selected from first year instructional programs (1971-72) and a pool of identified (for 1972-73) language-handicapped children, respectively. An aide was assigned to every two teachers. In addition, an educational diagnostician provided assistance, multidisciplinary student assessment was conducted upon referral, and specialized inservice training was available.

Intervention Program B. This program gave the classroom teacher the additional support of a resource specialist to work with language-handicapped children on an individual or small-group basis each day.

This program placed language-handicapped students in a resource room for approximately one hour each day for special assistance. In Program B were continued students in the fourth grade and new students in kindergarten, third, and sixth grades. An aide assigned to each resource teacher also worked closely with the classroom teacher. An educational diagnostician assisted the resource and classroom teachers. Specific instructional materials and specialized inservice training were included.

Intervention Program C. This program provided full service to fifty language handicapped children through the use of a differentiated staff, including a lead teacher, educational diagnostician, and four teacher aides. Students in this program were assigned to a large, self-contained, team teaching situation in the third and fourth grades. The classes included continued students (fourth grade) and new students (third and sixth grade). Aides were assigned to each team in the following manner: third and fourth grade--four aides; sixth grade--one aide. In addition, an educational diagnostician was assigned to each team, multi-disciplinary student assessments were conducted upon referral, specific instructional materials were available for use, and specialized inservice training was provided.

Programs for external control purposes. Two external control groups were designated: one for new students and one for continued students. All control students were randomly selected from a pool of identified language-handicapped children. Control classrooms were indistinguishable from ordinary classrooms. Classrooms in buildings

where intervention programs existed were not available for the control groups. Neither specialized inservice nor project resources (materials and personnel) were provided.

Programs for follow-up purposes. A follow-up was conducted on students who participated in an intervention program during the 1971-72 school year in order to permit a study of transitional effects. These children were identified through randomization procedures and placed in regular classrooms according to the normal assignment procedures of the school. Information from the first-year study on these students was transmitted to teachers by Language Center personnel; periodic follow-up reports were made on students' progress. At the end of the second year the criterion tests were administered to all follow-up pupils.

Subjects. The sample of *continued* students consisted of 71 students randomly selected from those students who participated in the first-year program. The sample of *new* students consisted of approximately 357 children randomly selected from a list of previously identified language-handicapped children. The control sample for the continued group consisted of the 90 students who served as an external control during the first-year project. A new external control group of 90 students was randomly selected from a list of identified language-handicapped children in non-project schools or grade levels.

Pretests were administered during the third week of school, consisting of the paragraph meaning, word meaning, and arithmetic subtests of the *Stanford Achievement Test*. Raw scores were converted

to standard scores for purposes of comparison.

The experimental program was regularly monitored and documented. Checklists were completed which focused on utilization of instructional objectives and usage frequency of a variety of instructional media, teaching techniques, and student-oriented activities.

Research Contrasts

Appropriate statistical contrasts were proposed to answer questions related to: two years of intervention, transitional effects, and one year of intervention.

In essence, four distinct experiments were conducted in the 1972-73 project. Each attempted to demonstrate the effect upon achievement and/or attitude of placing language-handicapped students in current programs or their having been placed in previous instructional programs. Three experiments concentrated on new, continued, and follow-up students; a fourth was conducted solely on new students to ascertain their attitudes toward school and toward themselves.

One year of intervention. The first experiment researched the effects of one year of intervention. This condition was examined in kindergarten, third, and sixth grades under a variety of instructional programs.

In kindergarten, identified language-handicapped children in the regular classroom and resource room were contrasted with other language-handicapped children in the regular classroom who were not identified to the teacher. Separate analyses were carried out for various subtests of the *Stanford Achievement Test*.

Four instructional programs in the third grade were contrasted using analysis of variance of the criterion measures. These four were: placement in a regular classroom, in a resource room, in a self-contained classroom, and in a control room where the language-handicapped child was indistinguishable from the normal child.

Four instructional programs in the sixth grade were compared using analysis of variance of the criterion measures. These four were: placement in a regular classroom, in a resource room, in a self-contained classroom, and in a control room.

At each grade level, the basic design was a two-factor analysis of variance with repeated measures (pretest and posttest) as one of the factors.

Two years of intervention. The second experiment conducted in the 1972-73 project researched students randomly selected from the first year project and retained for a second year. Programs were contrasted using analysis of variance of the criterion measures for the four fourth grade program interventions.

Follow-up. The third experiment conducted in the 1972-73 project researched students randomly selected from the first year project and returned to the regular classroom. A post-posttest analysis of variance was computed for each grade level to contrast previous placements.

Attitudes of Language-Handicapped Children

Measures of attitude from the *Self Appraisal Inventory* and the *School Sentiment Index*, were taken from a random sample of first year

(1972-73) students. Attitudes toward peers, school subjects, social structure, and attitudes in general were examined. Pre- and posttest measures were analyzed for attitudinal differences of children in the various programs.

Criterion Testing

Project pupils were administered the *Stanford Early School Achievement Test* at the kindergarten level and the *Stanford Achievement Test* at the third and sixth grade levels. This test battery served as the measure of school achievement in different academic areas.

School Sentiment Index (SSI) and Self Appraisal Inventory (SAI). The SSI and SAI were prepared by the Instructional Objectives Exchange division of the University of California at Los Angeles Center for the Study of Evaluation. The SSI measures pupil attitude toward school and the SAI measures pupil self concept. Some inapplicable items in both tests were deleted. Third and sixth grade pupils were administered the items by audiotape in order to reduce teacher influence on pupil response. These youngsters recorded their responses on separate answer sheets. The kindergarten versions of the SSI and SAI were read by the teacher to each pupil individually, with the teacher recording the pupil's responses.

Thirty-five pupils were drawn from each grade level of the experimental groups through a randomly stratified sampling procedure and administered the two measures. Control pupils were tested on both measures.

Results

Experimental results are presented in four sections: one year intervention for *new* students, two year intervention for *continued* students, follow-up, and attitudes. Within each section are indications of achievement for different grade levels.

One year intervention. For kindergarten, four criterion subtests were administered--environment, math, letters and sounds, and aural comprehension. In each case there was gain in achievement; however, only in the letters and sounds subtest was there differential gain. Children who spent part of their day with a resource teacher (Program B) achieved significantly more on this subtest than did control students.

For third grade, six criterion subtests were administered--word meaning, paragraph meaning, spelling, word study skills, language, and arithmetic computation. There were differential gains on the word meaning, paragraph meaning, spelling, and arithmetic computation subtests.

On the word meaning pretest there was a significant difference between Programs B and D, and Programs A and C. On the word meaning posttest there were no differences among Programs A, C, and D. However, there was a significant difference between Program B and the other programs. In terms of grade change, there were gains of 0.6, 0.5, 0.5, and 0.1 years for Programs A, B, C, and D, respectively.

On the paragraph meaning pretest there were no significant differences among students in Programs B, C, and D; however, these students scored significantly higher than did students in Program A.

On the posttest there were significant differences among all programs in the following order: B, C, D, A. In terms of grade change, there were gains of 0.4, 0.9, 0.7, and 0.4 years for Programs A, B, C, and D respectively.

On the spelling pretest there were no differences among programs; however, on the posttest there was a significant difference between Program A and Programs B, C, and D. Changes in grade were 0.5, 0.9, 0.9, and 0.6 for Programs A, B, C, and D.

On the arithmetic computation pretest there was a significant difference between Program A and Programs B, C, and D. Moreover, on the posttest there were differences between C and D, B and D, and D and A. Grade changes were 0.4, 0.6, 0.7, and 0.4 for Programs A, B, C, and D. Gains, in standard score form, on tests where significant differences were found are shown in Figure 2.

For sixth grade, five criterion subtests were administered--word meaning, paragraph meaning, spelling, language, and arithmetic computation. Differential gain occurred only on the spelling subtest. On the pretest there was a significant difference between Program C and Programs B and D; on the posttest there were no differences. Changes in grade equivalents were 0.5, 1.6, and 0.7 for programs B, C, and D respectively. Grade changes for third and sixth grade students within programs and by variable are summarized in Table 8.

An evaluation of grade gains for new third grade, continued fourth grade, and new sixth grade students is presented in Table 9. The greatest gain in terms of grade equivalent for third grade students occurred in Programs B and C, while the least gain occurred in Programs

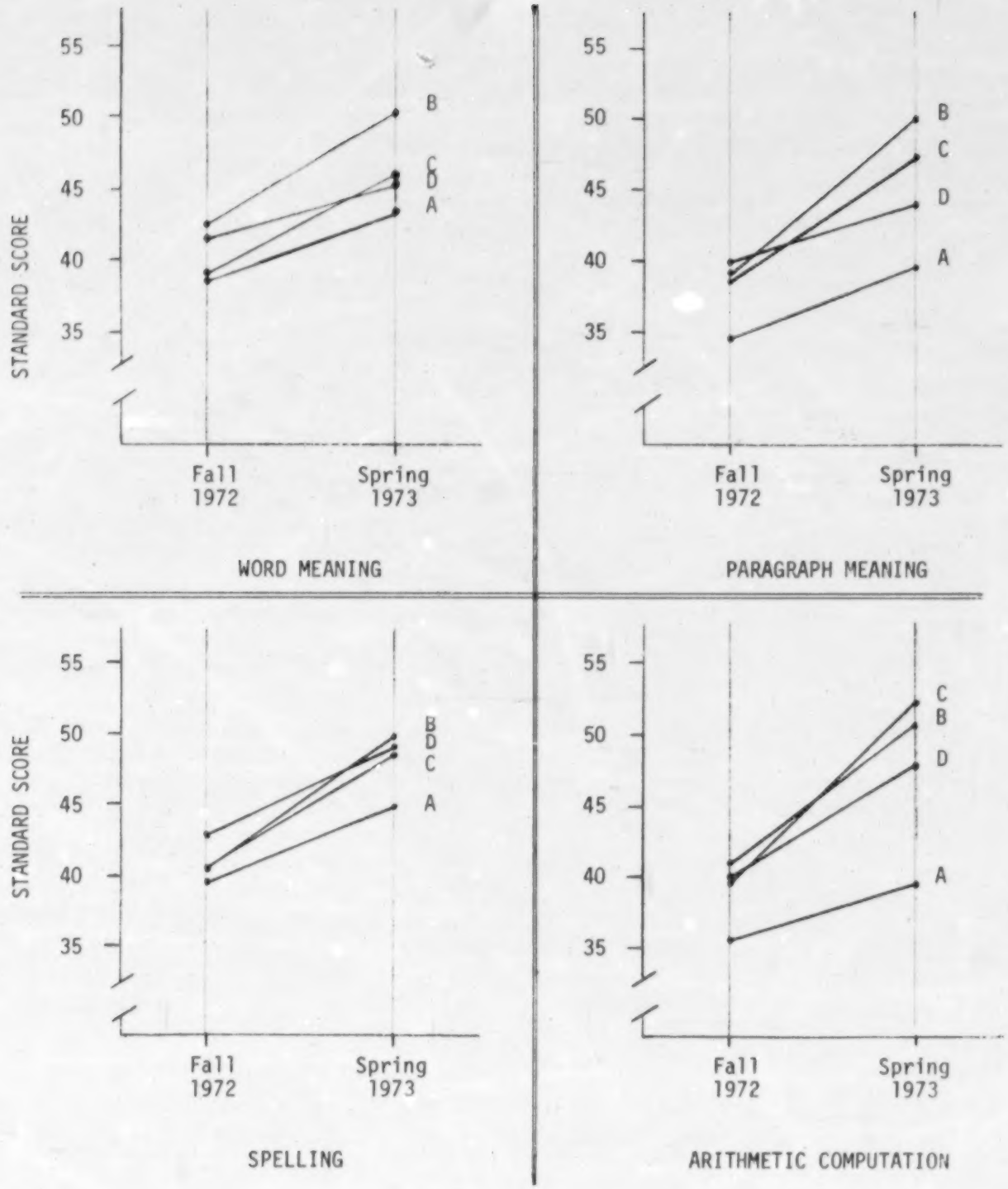


FIGURE 2
GAIN IN STANDARD SCORES ON SUBTESTS
FOR THIRD GRADE LANGUAGE-HANDICAPPED STUDENTS

TABLE 8

CHANGE IN GRADE EQUIVALENTS FOR
THIRD AND SIXTH GRADE NEW STUDENTS

VARIABLE	PROGRAM							
	A		B		C		D	
THIRD GRADE NEW	Pre	Post	Pre	Post	Pre	Post	Pre	Post
Word meaning	2.1	2.7	2.6	3.1	2.3	2.8	2.6	2.7
Paragraph meaning	1.9	2.3	2.2	3.1	2.2	2.9	2.2	2.6
Spelling	2.0	2.5	2.2	3.1	2.2	3.1	2.3	2.9
Word study skills	1.8	2.4	2.2	2.9	2.4	3.1	2.1	2.7
Language	2.3	2.7	2.4	3.0	2.2	2.8	2.3	2.7
Arithmetic computation	2.1	2.5	2.5	3.1	2.5	3.2	2.5	2.9
SIXTH GRADE NEW								
Word meaning			4.6	5.5	4.5	5.1	4.6	5.6
Paragraph meaning			4.9	5.5	4.8	5.2	4.8	5.7
Spelling			4.7	5.2	3.8	5.4	4.5	5.2
Language			4.2	5.5	4.0	5.4	4.2	5.5
Arithmetic computation			4.9	5.5	4.5	5.7	4.8	5.8

D and A. In the fourth grade the most gain was again in Programs C and B. In the sixth grade the greatest gain was typically evidenced in Programs C and D.

It is difficult to generalize as to which program is most effective since each is effective specific to grade level and type of school achievement. An additional analysis compared grade gains for experimental programs to the control. Using the control group as a basis for comparison, it was demonstrated that for each subtest there

TABLE 9

EVALUATION OF GRADE GAIN FOR NEW THIRD AND SIXTH GRADE AND CONTINUED FOURTH GRADE STUDENTS

VARIABLE	PROGRAM					
	Least Gain	A	B	C	D	Most Gain
THIRD GRADE NEW						
Word meaning	D	.6	.5	.5	.1	A
Paragraph meaning	D-A	.4	.9	.7	.4	B
Spelling	A	.5	.9	.9	.6	B-C
Word study skills	D-A	.6	.7	.7	.6	B-C
Language	D-A	.4	.6	.6	.4	B-C
Arithmetic computation	D-A	.4	.6	.7	.4	C
FOURTH GRADE CONTINUED						
Word meaning	D	.6	.4	.9	.2	C
Paragraph meaning	D	.9	1.0	.5	.5	B
Spelling	D-A	.8	1.1	1.1	.8	C-B
Word study skills	D	.5	.7	1.2	.4	C
Language	D	.5	.7	.7	.1	C-B
Arithmetic computation	D	.2	1.1	.9	.1	B
SIXTH GRADE NEW						
Word meaning	C		.9	.6	1.0	D
Paragraph meaning	C		.6	.4	.9	D
Spelling	B		.5	1.6	.7	C
Language	B		1.2	1.4	1.3	C
Arithmetic computation	B		.6	1.2	1.0	C

were greater positive grade gains in Programs B and C and on word meaning for Program A (Figure 3).

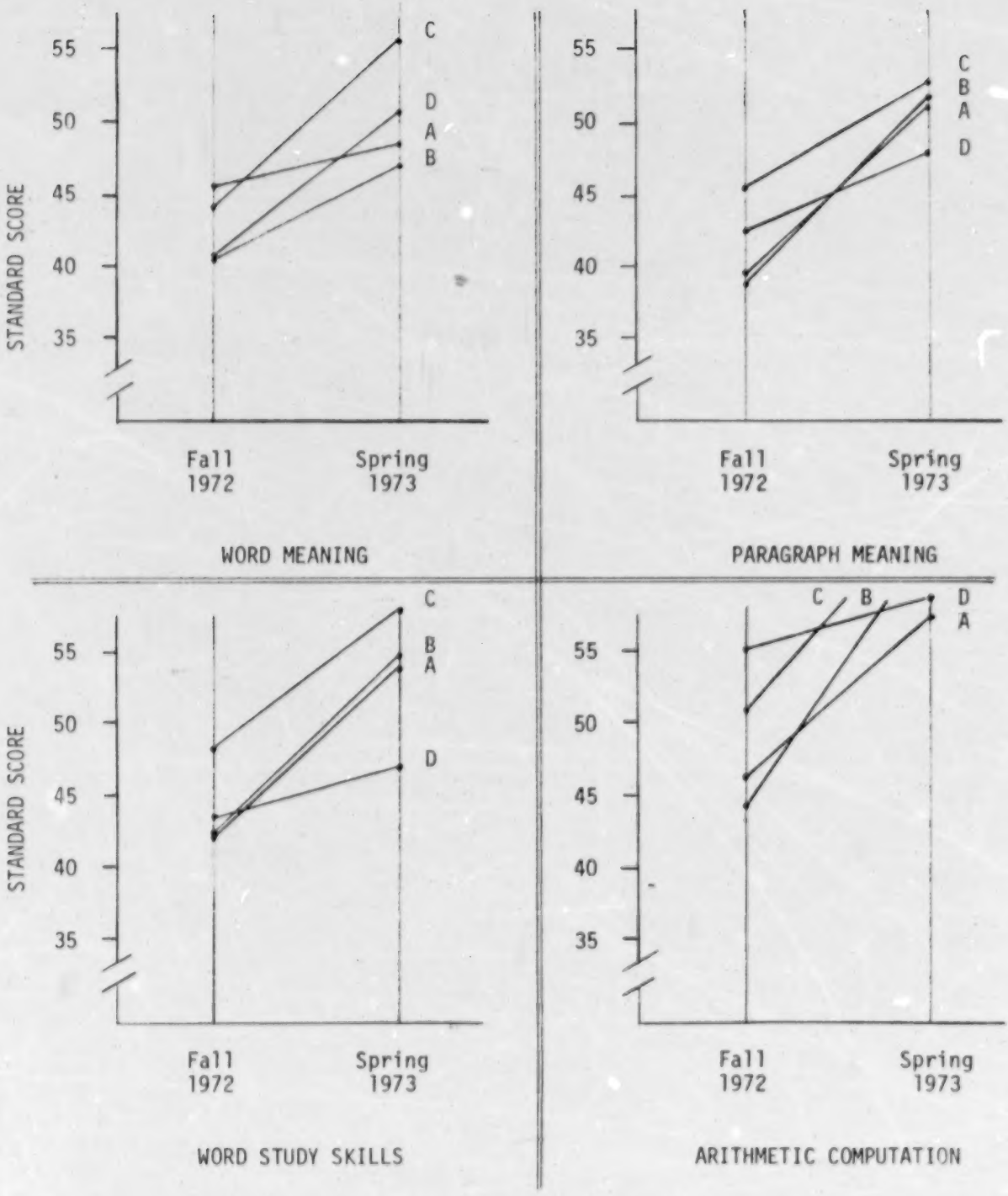


FIGURE 3
GAIN IN STANDARD SCORES ON SUBTESTS
FOR SECOND YEAR STUDENTS

Second year of intervention. For continued students six subtests were administered--word meaning, paragraph meaning, spelling, word study skills, language, and arithmetic computation. Significant differential gains appeared between pretests and posttests on four subtests--word meaning, paragraph meaning, word study skills, and arithmetic computation.

On the word meaning pretest, significant differences were noted between Programs C and D and Programs A and B. On the posttest there were significant differences between Program C and Program D. Differences were also found between Program A and Program B; there was no difference between A and D. There were grade equivalent changes of 0.6, 0.4, 0.9, and 0.2 years for Programs A, B, C, and D, respectively.

The paragraph meaning pretest showed significant differences between Program C and Programs A, B, and D. No posttest differences appeared among A, B, and C; however, there was a significant difference between these programs and the control group D. Grade gains for Programs A, B, C, and D on the paragraph meaning subtest were 0.9, 1.0, 0.5, and 0.5 years, respectively.

In word study skills the gain was 0.5, 0.7, 1.2, and 0.4 years for the four programs: A, B, C, and D. Pretest and posttest scores were significantly different. the greatest amount of gain occurring in Programs B and C on this subtest.

The arithmetic computation subtest revealed gains of 0.2, 1.1, 0.9, and 0.1 years for the four programs; there were differential gains among the programs. Gains, in standard score form on tests where significant differences were found, are shown in Figure 4.

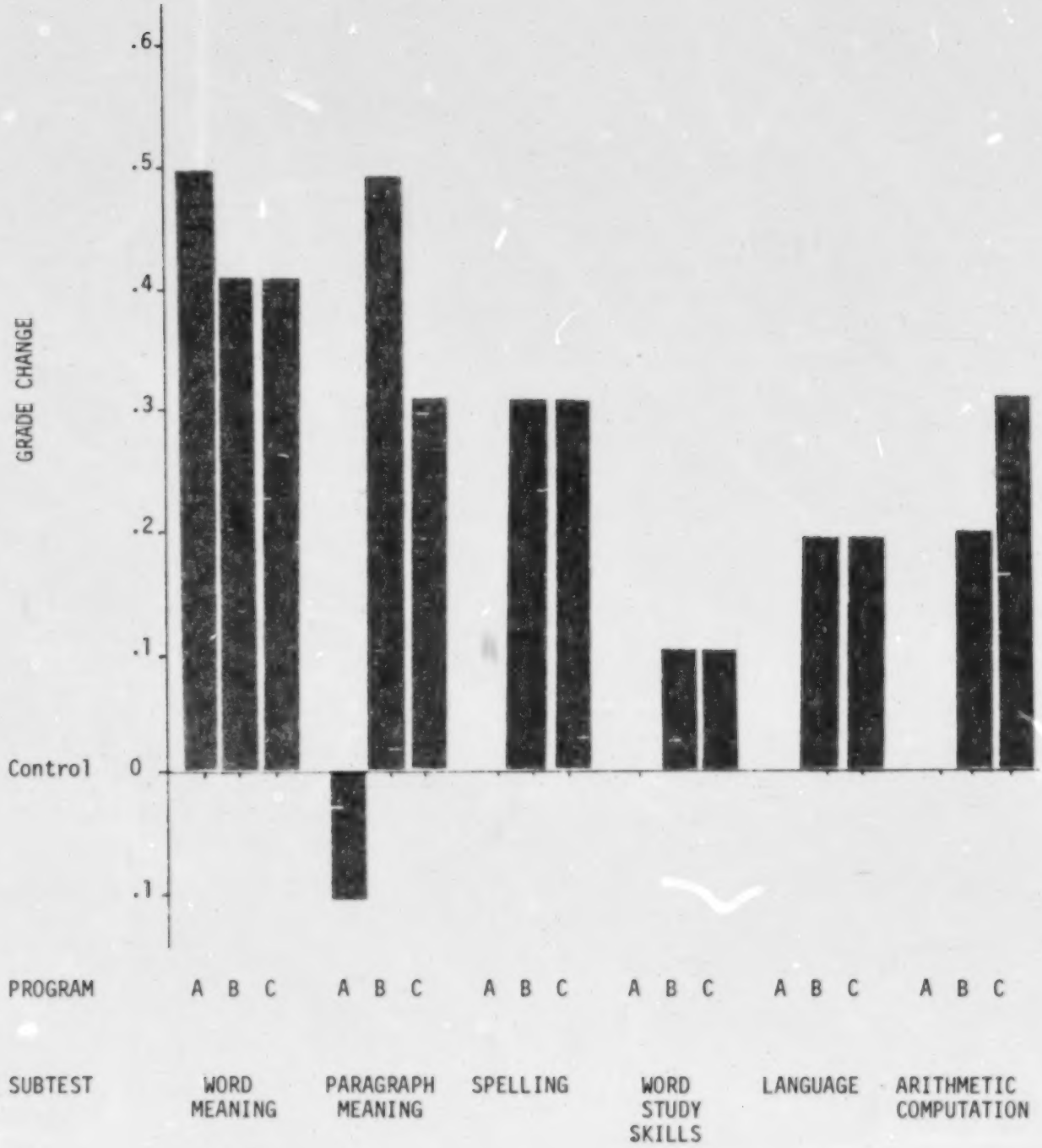


FIGURE 4
GRADE CHANGE OF PROGRAMS USING
CONTROL AS BASIS FOR SCALING-THIRD GRADE NEW STUDENTS

Follow-up

Differential gains among follow-up first grade students were found on three subtests--math, letters and sounds, and aural comprehension. At the end of the first year, Program D students generally scored higher on the criterion tests than students from Programs A or B. However, at the end of the second year, students from Program B scored higher than those from Program A and had "closed the gap" with students from Program D.

For fourth grade follow-up students differential gains were found for three subtests--arithmetic computation, spelling, and language. Again the students from Program D scored higher on the pretest than those from Programs A, B, or C. On the posttests students from Programs C and B generally scored higher than those students from Programs D or A.

For seventh grade follow-up students differential gains were found for one subtest--arithmetic computation. Students from Programs A and B gained more in achievement than those from Program D. The grade-equivalent gains for the three grade levels are presented in Table 10.

Attitudes of Children with Language Handicaps

One of the objectives of the second year program was to determine the attitude of the language-handicapped child toward himself and toward school.

Attitude toward self. The results of this examination revealed that the objective was accomplished since a large majority of students exhibited a positive attitude toward school and toward self. In terms of self appraisal, examination of differential effects due to program intervention

TABLE 10

GAIN IN GRADE EQUIVALENTS FOR
FOURTH AND SEVENTH GRADE FOLLOW-UP

	PRETEST Spring 1972				POSTTEST Spring 1973				GRADE GAIN			
FOURTH GRADE FOLLOW-UP	A	B	C	D	A	B	C	D	A	B	C	D
Word meaning	2.6	2.7	2.6	2.5	3.0	3.3	3.4	2.9	.4	.6	.8	.4
Paragraph meaning	2.1	2.5	2.5	2.4	2.8	3.1	3.3	3.1	.7	.6	.8	.7
Spelling	2.3	2.5	2.5	2.4	3.0	3.3	3.6	2.9	.7	.8	1.1	.5
Language	2.5	2.4	2.3	2.7	2.8	3.1	3.1	2.8	.3	.7	.8	.1
Arithmetic computation	2.5	3.6	3.1	3.2	3.0	3.8	4.3	3.0	.5	.2	.2	-.2
SEVENTH GRADE FOLLOW-UP												
Word meaning	4.2	4.1		4.0	4.7	4.7		4.7	.5	.6		.7
Paragraph meaning	4.1	4.2		4.2	4.8	4.6		4.8	.7	.4		.6
Spelling	4.4	4.0		4.0	4.7	4.1		4.8	.3	.1		.8
Language	3.7	3.6		3.6	4.2	4.0		4.2	.5	.4		.6
Arithmetic computation	4.3	4.2		4.1	4.8	4.5		4.6	.5	.3		.5

revealed no apparent consistency and therefore generalizations were difficult.

For kindergarten pupils, there was an increase in positive appraisal of self with no apparent differences among programs. In the third grade there were increases in appraisal of "self in school" attributable to Programs C and D but not B. Similarly there were increases in self esteem due to Programs B and D but not Program C. There were no apparent changes in appraisal of self in the sixth grade.

Attitude toward school. Each of the three grade level tests

contained measures of general attitude toward school, toward peers in school, and toward school subjects: in addition, the sixth grade test measured attitude toward language. Kindergarten students in Program B increased in positive attitude toward peers, while there was no change in attitude toward specific aspects of school. Program D students showed a decline in positive attitude toward school and toward peers; no change in attitude toward specific aspects of school appeared.

Sixth grade students in Programs B, C, and D exhibited a decline in positive attitude toward school and peers, no change toward learning, and an increase in positive attitude toward specific aspects of school.

Evaluation of Performance Objectives

The school year performance objectives were all achieved. The accomplishment of these objectives is summarized below.

Continued students showed significant achievement gains in language skill areas, namely, word meaning, paragraph meaning, and spelling skills. New students also showed significant achievement gains in language skills, namely, in word meaning, paragraph meaning, and spelling skills for third grade students, and in spelling skills for sixth grade students. In general, project students displayed a positive attitude toward self and school.

Summary of Second Year Results

1. Language-handicapped children in kindergarten resource rooms demonstrated greater achievement than those in control rooms.

2. Language-handicapped children in both a third grade resource room and a room with a team of special instructional personnel, achieved more than third grade students in a control room.

3. There were no differences in achievement gain among programs in the sixth grade.

4. Language-handicapped children who were continued for a second year in a resource room and a room with special instructional personnel gained more than those in the control or regular classrooms.

5. Follow-up students continued to gain in achievement throughout the second year.

6. Students with one year of intervention exhibited a positive attitude toward self and toward school.